AN EPIDEMIOLOGICAL STUDY OF LEARNING DISABLED ADOLESCENTS IN SECONDARY SCHOOLS: CLASSIFICATION AND DISCRIMINATION OF LEARNING DISABLED AND LOW-ACHIEVING ADOLESCENTS

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The University of Kansas Institute for Research in Learning Disabilities is supported by a contract (#300-77-0494) with the Bureau of Education for the Handicapped, Department of Health, Education, and Welfare, U. S. Office of Education, through Title VI-G of Public Law 91-230. The University of Kansas Institute, a joint research effort involving the Department of Special Education and the Bureau of Child Research, has specified the learning disabled adolescent and young adult as the target population. The major responsibility of the Institute is to develop effective means of identifying learning disabled populations at the secondary level and to construct interventions that will have an effect upon school performance and life adjustment. Many areas of research have been designed to study the problems of LD adolescents and young adults in both school and non-school settings (e.g., employment, juvenile justice, military, etc.)

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Cooperating Agencies

Were it not for the cooperation of many agencies in the public and private sector, the research efforts of The University of Kansas Institute for Research in Learning Disabilities could not be conducted. The Institute has maintained an on-going dialogue with participating school districts and agencies to give focus to the research questions and issues that we address as an Institute. We see this dialogue as a means of reducing the gap between research and practice. This communication also allows us to design procedures that: (a) protect the LD adolescent or young adult, (b) disrupt the on-going program as little as possible, and (c) provide appropriate research data.

The majority of our research to this time has been conducted in public school settings in both Kansas and Missouri. School districts in Kansas which are participating in various studies include: United School District (USD) 384, Blue Valley; USD 500, Kansas City; USD 469, Lansing; USD 497, Lawrence; USD 453, Leavenworth; USD 233, Olathe; USD 305, Salina; USD 450, Shawnee Heights; USD 512, Shawnee Mission, USD 464, Tonganoxie; USD 202, Turner; and USD 501, Topeka. Studies are also being conducted in Center School District and the New School for Human Education, Kansas City, Missouri; the School District of St. Joseph, St. Joseph, Missouri; Delta County, Colorado School District; Montrose County, Colorado School District; Elkhart Community Schools, Elkhart, Indiana; and Beaverton School District, Beaverton, Oregon. Many Child Service Demonstration Centers throughout the country have also contributed to our efforts.

Agencies currently participating in research in the juvenile justice system are the Overland Park, Kansas Youth Diversion Project and the Douglas, Johnson, and Leavenworth County, Kansas Juvenile Courts. Other agencies have participated in out-of-school studies--Achievement Place and Penn House of Lawrence, Kansas, Kansas State Industrial Reformatory, Hutchinson, Kansas; the U.S. Military; and the Job Corps. Numerous employers in the public and private sector have also aided us with studies in employment.

While the agencies mentioned above allowed us to contact individuals and supported our efforts, the cooperation of those individuals--LD adolescents and young adults; parents; professionals in education, the criminal justice system, the business community, and the military--have provided the valuable data for our research. This information will assist us in our research endeavors that have the potential of yielding greatest payoff for interventions with the LD adolescent and young adult.

AN EPIDEMIOLOGICAL STUDY OF LEARNING DISABLED ADOLESCENTS IN SECONDARY SCHOOLS

Abstract

In recent years, professionals in the field of learning disabilities have begun to address the impact of learning disabilities on adolescents and young adults. Although substantial attention has been directed to the manifestations of learning disabilities in elementary school age populations, the significantly different and increasingly complex demands on adolescents both in and out of school necessitate the development of systematic research on this population. The University of Kansas Institute for Research in Learning Disabilities has collected a broad array of data to form an epidemiological data base on LD adolescents and young adults. Data have been collected from learning disabled, low-achieving, and normal-achieving adolescents as well as from their parents and teachers. In addition, information from the environmental setting of the LD adolescents which pertains to interventions applied on behalf of the student, relationships with others, conditions under which he/she operates and support systems available for his/her use has also been collected. These data have been considered in relation to data on specific learner characteristics to gain a more complete profile of the older LD individual.

Research results presented in Research Reports 12 through 20 detail findings from this comprehensive epidemiology study conducted during 1979-80 by the Institute. It is important for the reader to study and view each of these individual reports in relation to this overall line of research. An understanding of the complex nature of the learning disability condition only begins to emerge when each specific topic or finding is seen as a partial, but important, piece of a larger whole.

The specific aspects of the total study presented in individual Research Reports are listed below:

Research Report No. 12:	Details of the Methodology
Research Report No. 13:	Achievement and Ability, Socioeconomic Status, and School Experiences
Research Report No. 14:	Academic Self-Image and Attributions

Research Report No. 15: Health and Medical Factors

Research Report No. 16: Behavioral and Emotional Status from the Perspective of Parents and Teachers

Research Report No. 17: The Relationship of Family Factors to the Condition of Learning Disabilities

Research Report No. 18: Social Status, Peer Relationship, Activities In and Out of School, and Time Use

Research Report No. 19: Support Services

Research Report No. 20: Classification of Learning Disabled and Low-Achieving Adolescents

AN EPIDEMIOLOGICAL STUDY OF LEARNING DISABLED ADOLESCENTS IN SECONDARY SCHOOLS:

CLASSIFICATION AND DISCRIMINATION OF LEARNING DISABLED AND LOW-ACHIEVING ADOLESCENTS

Since the inception of the learning disability field in the early 1960s, emphasis for treatment and intervention has been on younger children. Only recently has attention been turned to addressing the educational and life adjustment needs of adolescents and young adults as well (Alley & Deshler, 1979). A prerequisite step to developing sound instructional systems and procedures for the older-aged learning disabled is for the field to achieve a thorough understanding of the complex nature of the condition of learning disabilities in older populations.

There are some unique problems related to adolescents with learning disabilities (LD) which have not been adequately addressed within the research on learning disabilities in elementary populations. Among these are the following. The demands of the curriculum in secondary schools or job requirements in employment settings are significantly different from the demands placed on LD students in elementary settings. Thus, the manifestations of the specific learning disability may be altered. Second, there are many variables associated with the condition of learning disabilities. It would appear that the complexity and interaction of these increase as the adolescent moves from school to non-school settings and as the number and variety of his/her social groupings increase (Deshler, 1978). Thirdly, there is very little knowledge

about the conditions confronting the LD adolescent and young adult in non-school settings and the degree to which these individuals can cope with these circumstances.

The complex nature of the condition of learning disabilities and the unique features of the conditions and the environment facing the LD adolescent and young adult demonstrate the need for systematic research on this population. Therefore, the purpose of a major line of research conducted by The University of Kansas Institute for Research in Learning Disabilities has been to collect a broad array of data to form an epidemiological data base on older LD populations. Data have been collected from the environmental setting of the LD adolescent which pertain to interventions applied on behalf of the student, conditions under which he/she operates, and support systems available for his/her use. These data have been considered in relation to data on specific learner characteristics to gain a more complete profile of the older LD individual.

Research results presented in Research Reports 12 through 20 detail findings from this comprehensive epidemiology study conducted during 1979-80 by the Institute. It is important for the reader to study and view each of these individual reports in relation to this overall line of research. An understanding of the complex nature of the learning disability condition only begins to emerge when each specific topic or finding is seen as a partial, but important, piece of a larger whole. This specific research report will present the results of an attempt to effect the multivariate classification and discrimination of LD and low-achieving adolescents using discriminant analysis techniques.

In Research Reports 13 through 19, low-achieving, LD, and normal-achieving youths are compared on a very large number of individual variables. The picture derived from studying these comparisons suggests that behavioral, attitudinal and test characteristics of low-achieving and LD students are much more similar than they are dissimilar. This perspective is corroborated by two other reports in which LD and low-achieving students were compared at the elementary level (Taylor, Sutz, and Friel, 1979; Ysseldyke, Algozzine, Shinn, and McGue, 1979). Taylor et al. compared seven- and eight-year old reading disabled males to a group of similar-age males who were also poor readers. Children who were poor readers were categorized as being either "dyslexic" or "non-dyslexic" according to whether or not they met criteria strikingly similar to those provided in current federal guidelines for the identification of LD students. The two groups were compared across a number of measures. Based on their data, Taylor et al. reached the following conclusion:

> The present study indicates that a substantial proportion of reading disabled seven- and eight-year-old white boys may meet criteria for developmental dyslexia (50 percent). At the same time, however, it challenges the traditional notion of dyslexia as easily dissociated from other reading disorders. The results showed that dyslexics could not be distinguished from non-dyslexic poor readers along any of several dimensions, including the initial severity and progression of the reading disturbance, frequency of reversal errors, familial reading and spelling competencies, math skills, neuro-behavioral performance, or personality functioning. As these represent most of the dimensions along which dyslexics have been traditionally viewed as "distinctive," the present results raise serious doubts as to the clinical value of this diagnosis, at least as applied to a general population of male school children. (p. 97)

In a study conducted by the University of Minnesota Institute for Research in Learning Disabilities (Ysseldyke et al., 1979), very similar conclusions were reached. After determining the performance of LD and low-achieving elementary-aged children on a number of psychometic tests, attempts were made, using such techniques as discriminant analysis, to differentiate students in the two groups. The authors were largely unsuccessful in their attempts to make such a discrimination.

In our own epidemiological study we did obtain strong differences between LD and low-achieving students in terms of their cluster scores on tests of reading, mathematics, and written language achievement, and measured ability (Warner, Alley, Schumaker, and Deshler, 1980). In selecting students for our low-achieving sample, one of the criteria was that the students had all scored below the 33rd percentile on the composite score from a group achievement test. Thus, the achievement differences that we obtained may have been due, in part, to our sample selection procedures. However, one of the reasons that the achievement criterion for the low-achieving group was set so high in the first place (i.e., below the 33rd percentile), was that we had difficulty finding sufficient numbers of very low-achieving students (i.e., achieving below the twenty-fifth percentile) outside of special education. On the one hand, this suggests that along with the very poor achievement scores obtained by the LD group (the median score for this group on each of the three achievement clusters was below the 10th percentile), very

poor performance on tests of basic academic skills is a meaningful characteristic of LD adolescents and one that serves powerfully to differentiate them from low-achieving students in general. On the other hand, very low-achieving adolescents who do not receive special services may be dropping out at a rate faster than those who do.

The principal purpose behind the present study was to determine which variables added significantly to group discrimination after ability and achievement had been controlled statistically, i.e., after a cognitive/academic variable had first been entered into a discriminant function. In addition, we wanted to determine the extent to which we could correctly classify LD and low-achieving students based solely on their performance on ability and achievement tests. Further, we wanted to estimate the extent of additional correct classification we could obtain beyond that provided by the ability/achievement data. Finally, we wanted to determine which variables entered the discriminant functions for more than one of four samples, that is, which effects could be replicated at least once.

Methodology

Subjects

Two groups of adolescents, their parents, and their regular classroom teachers served as subjects in the present investigation. The adolescents included LD students and low-achieving students in grades 7, 8, 9, 10, 11, and 12. LD students were those currently being served in programs for learning disabled students and validated by the IRLD Validation team. Low-achieving (LA) students were students who had recently received one or more failing grade in required subjects,

scored below the 33rd percentile on group administered achievement tests, and who were not receiving special educational services. The students, their parents and teachers agreed to participate in this study. For more details on student selection, see The University of Kansas Institute for Research in Learning Disabilities Research Report No. 12 (Schumaker, Warner, Deshler, & Alley, 1980).

Settings

Students were drawn from two large metropolitan school districts in Kansas. One of the district's populations (District A) can be characterized as being of high socio-economic status. In the other district (District B), a preponderance of residents are of lower socio-economic status. The students provided information for this study in small, quiet rooms selected by their schools. Parents and teachers provided information at their leisure at home or at school. (For more information regarding settings see Schumaker et al., 1980.)

Measurement Systems

The predictor variables used in this study were derived from factor analyses of the Youth, Parent, and Regular Teacher Assessment Instruments, along with ability and achievement test scores. The assessment instruments tapped a wide range of attitudes, behaviors and characteristics of the student subjects and their parents and teachers by asking them to answer a number of questions. Several different answer formats were used in the questions. Some involved Likert-type scales, others involved multiple-choice answers, and still others allowed open-ended responding. (For more information about the instruments see Schumaker et al., 1980).

Ability and achievement data included an estimated I.Q. score (based on selected Wechsler subtests) and the three achievement cluster scores from the Woodcock-Johnson Psycho-educational Battery (WJPB): Reading, Mathematics, and Written Language.

Procedures

In individual sessions, the students were read the questions (and possible answers) by an interviewer. The students' responses were recorded on the instrument either by the interviewer or the student, at the student's choice. Ability and achievement tests were administered by trained examiners according to instructions provided in the test manuals. Parent Instruments were either mailed or carried home by the students. Follow-up letters and phone calls prompted delayed returns. Regular teachers filled out the Regular Teacher Instrument at their convenience and appropriate follow-up prompts were made when necessary.

Data Analysis

A thorough discussion of the specific procedures used in data analysis as well as the rationale for those procedures is contained in Research Report Number 12, Details of the Methodology (Schumaker et al., 1980).

All of the predictor variables studied in the present report are FSCALES, with the exception of two, the Written Language cluster score from the Woodcock-Johnson and the Sex of the student. The FSCALES were derived by equally weighting and averaging performance on two or more items from one of the assessment instruments. Based on a factor analysis of each of three assessment instruments, items were combined into an FSCALE if they had a moderate to strong loading on the same

factor. (A complete listing of the items which made up each FSCALE is contained in Research Report Number 12.) For each of the three factor analyses, ability and achievement test scores were included, along with individual items from the assessment instrument.

For the factor analyses of the Parent and Regular Teacher instruments, selected S.E.S.-related variables from the Youth instrument were also included. For the Youth, Parent, and Regular Teacher Instruments, respectively, 28, 25, and 14 factors were derived. Three sets of FSCALES were then constructed from these factors.

In each of the three factor analyses a cognitive/academic factor emerged in which the ability and achievement test scores contributed heavily to that factor. Thus, one of the FSCALES in each of the three sets was a cognitive FSCALE which represented a composite of ability and achievement test data.

Because of expected achievement differences across junior high and senior high levels and because of suspected district effects, discriminant analyses were conducted separately for four distinct samples of LD adolescents: junior high students in District A (higher S.E.S. district), junior high students in District B (lower S.E.S district) senior high students in District A, and senior high students in District B. Separate discriminant analyses were conducted for each of these groups using each of the three sets of FSCALES, resulting in a total of twelve major discriminant analyses.

All discriminant analyses were conducted using the BMDP7M computer program (Dixon, 1975) and the default options therein. This program carries out a stepwise discriminant analysis according

to the following default method. The assumed value of F-to-enter and F-to-remove is 4.0. The variable with the highest F-to-enter value above 4.0 at each step is entered first. After a variable is entered at any step, if the F-to-remove value of any variable in the set falls below 4.0, that variable is removed. Because of the degrees of freedom associated with each of the major discriminant analyses reported here, these F-to-enter and F-to-remove values assumed that each variable that remained in the discriminant function added significantly to prediction at least at the .05 level.

After the stepping procedure is completed, the program constructs discriminant functions. Based on these functions, a classification matrix is constructed. Students are classified into groups based on their scores on the discriminant functions and the percent of each group (LD and low-achieving) that is correctly classified is calculated.

Each of the twelve major discriminant analyses was followed by a second analysis in which only the cognitive FSCALE was allowed to enter. The extent of correct classification for each of these latter analyses was compared to the extent of classification in the respective major analyses.

After the above analyses were completed, two facts became apparent. First, when variables that made up the FSCALES were considered separately, the Written Language cluster score of the WJPB was frequently found, by itself, to be associated with very strong differences between performances of students in the LD and low-achieving groups. Because the discriminant analyses associated with the Youth Assessment Instrument were conducted

on the largest samples, a separate attempt at group classification was conducted with this sample using only the Written Language cluster score as a predictor. This latter analysis was repeated for each of the four level by district samples.

The second fact that became apparent after the initial analyses were conducted was that certain FSCALES, associated with the Parent instrument, might be a response of the parent to the fact that their son or daughter was receiving special education services. We wanted to consider the effect of removing these FSCALES which seemed consequent to the LD level from both set of predictor variables, for each of the four level-by-district samples. Thus, four additional analyses were completed.

Results and Discussion

The results of the various discriminant analyses are presented in Tables 1 through 24. For each of the twelve major analyses a detailed summary of the analysis is provided in one table. Each of these tables is followed by a table which includes the associated classification matrix for that analysis. Tables 25, 26, and 27 summarize the percent of total correct classification for all of the analyses discussed. Table 28 summarizes the instances in which explications across samples occurred. Outcomes will be discussed separately for analyses associated with each of the three assessment instruments.

Youth Assessment Instrument

Across the four samples, a similar pattern emerged in discriminant analyses involving the Youth Assessment Instrument and the cognitive/

academic FSCALE. The cognitive/academic FSCALE entered first and was associated with a high F value in three out of the four samples. The exception was District B-Junior High Sample. Table 25 presents the percent of correct classification that was achieved using the cognitive/academic FSCALE alone. Depending on the sample, between 62 and 77 percent correct classification was achieved using only the one FSCALE. As can be seen in the Table 25 when these percentages are compared within each sample to those obtained using all the FSCALES, the gain in percent correctly classified is negligible. The largest gain occurred in the District A-Senior High group and was only a net gain of 4 percent.

As mentioned earlier, separate analyses were run for the four district-by-level samples in which only the Woodcock-Johnson cluster score for Written Language achievement was allowed to enter as a predictor variable. The results of these four analyses, in terms of the percent of total correct classification obtained, are presented in Table 25. As can be seen, the Written Language cluster score does as well as the cognitive/academic FSCALE in terms of effecting correct classification.

Very few of the FSCALES associated with the Youth Instrument entered the discriminant function once the congitive/academic FSCALE had entered. This was in spite of the fact that the criteria for entry are rather liberal (F-to-enter = 4.00). Of those Youth FSCALES that did enter, none of them appeared in more than one of the four samples. FSCALES associated with supportive parents did enter the District A samples (Tables 1 and 3) but not the District B samples (Tables 2 and 4). The data suggest that, to a limited extent LD parents may be more supportive and nurturant than LA parents. This supports the

findings derived from studying parent responses to be reported next (c.f. Tables 9 and 15).

Parent Assessment Instrument

As with the analysis involving the Youth instrument, Parent analyses reflected the same general pattern across the four samples. That is, the cognitive/academic factor entered first in each of the four analyses. Using the cognitive/academic FSCALE alone, between 63 and 77 percent total correct classification occurred across the four samples, as presented in Table 26. Unlike the Youth analyses, considerable gain in percent correctly classified occurred when all of the Parent FSCALES were allowed to enter. Between 7% and 24% gain occurred, depending on the sample.

When the individual FSCALES that entered the discriminant function are considered a number of them appear to be related to parent perceptions and attitudes. These perceptions and attitudes quite likely have been influenced by the son or daughter having been labeled by the school as LD. This seems particularly true of these Parent FSCALES: S7, 16, 22, 23, and 25 (See Tables 9, 11, 13).

Therefore, another set of four analyses was run in which these particular FSCALES were not allowed to enter the discriminant function. The percentages of correct classification that resulted are shown in Table 26 under "Selected FSCALES". Comparing these percentages to those for the cognitive/academic FSCALE alone, much more moderate gains are noted, ranging from 5 to 13 percent additional correct classification.

Many of the Parent FSCALES that entered discriminant functions appeared only in one of the four samples. Two of the FSCALES entered for two of the samples, but the direction of group differences on each

FSCALE differed across the two samples. These scales are S5, and S13 and the relevant data are presented in Tables 9 and 15. For only two Parent FSCALES were consistent replications found, "parent support" and "glasses prescribed". The specific nature of these results is presented in Table 28. On the one hand "parent support" entered (LD parents were more supportive) in two of the samples. This finding along with the data from the Youth instrument supports the results of our univariate analyses of these same data (Schumaker, Deshler, Alley, and Warner, 1980, Research Report No. 17). The finding is limited by the fact that in two of the samples the "parent support" FSCALE did not enter. The "glasses prescribed" FSCALE entered for the two high school samples only. LD high school students more often had a history of glasses being prescribed. In the univariate analyses of this variable, reported by Alley, Deshler, Warner, and Schumaker (1980) a more stringent criteria for group differences was applied and LD and LA high school students were found not to be different with respect to history of "glasses prescribed".

Regular Teacher Instrument

Results pertaining to the Regular Teacher Instrument are summarized in Tables 17 through 24, and Tables 27 and 28. Considering first Table 27, a familiar pattern emerges. Between 59 and 79 percent correct classification occurred, depending on the sample, using only the cognitive/academic FSCALE. The gain in percent of correct classification which occurred by considering all of the Teacher FSCALES ranged from 7 to 10 percent across the four samples.

When considering the individual FSCALES that entered into the

discriminant functions, it is interesting to note that on many of the associated behaviors, LD students were actually rated more positively by their classroom teachers than were low-achieving students. Inconsistencies were again apparent, however. For example, the direction of the difference for the Teacher FSCALE, S10, was the opposite in two samples (See Tables 17 and 21). Only two of the FSCALES were replicated across more than one sample, "courteous to teacher" (LDs were rated as more courteous across the two junior high samples) and "misinterprets what others say/has trouble learning from experiences." Low-achieving students were rated as having more trouble in this latter area, but only across the two high school samples. In the case of the "courteous to teacher" FSCALE the data are consistent with the univariate analyses reported in Research Report 16 (Alley, Warner, Schumaker, and Deshler, 1980). In the case of the "misinterprets" FSCALE, the more stringent univariate criteria did not yield significant group differences on the component variables.

Summary

The impression one is left with after a careful and analytic look at these data is as follows. The variables which reliably differentiate the LD and low-achieving students in the present study are ability and achievement test scores, either in the form of the cognitive/academic FSCALE, or the single Written Language cluster score. In three of the four district-by-level samples, two-thirds or more of the students were correctly classified using either of these achievement and ability measures. As discussed in the introduction, these group differences may to some extent

be an artifact of the way in which the samples were selected. On the other hand, LD adolescents as a group exhibit very low levels of achievement and their ability test scores are depressed.

Once ability and achievement are taken into account, very little else consistently adds to the classification and discriminant process. In short, the LD and low-achieving groups in this study appear to be much more alike than they are unalike. This conclusion is very similar to the ones reached by Taylor et al. (1979) and Ysseldyke et al. (1979) in their studies of elementary-aged LD students. Important implications can be derived with regard to the process of identification of LD adolescents. If the data from this study and the other studies just mentioned can be cross-validated, then it seems likely that there are a number of students in public schools who are functionally like LD students, but who are not currently receiving special education services. In fact, an interesting and important question raised by these data is the following: If LD and low-achieving students are so similar in their characteristics, why have certain students been labeled, whereas other similar-acting students have not? Our data do not shed much light on this question. The answer may lie more in the characterization of the identification process than in the characterization of the students. A contributing factor may be that parents of LD students serve as better advocates for their sons and daughters (Schumaker et al, 1980, Research Report No. 17).

The total population of low-achieving and under-achieving adolescents is a heterogeneous one. Progress in the identification of LD adolescents will likely be made when subgroups of LD adolescents can be identified in such a way that membership in these subgroups has meaningful

instructional implications. These conditions in turn depend on the development of an instructional theory that explains and predicts the relationships between learner attributes, instructional process variables, and learning outcomes.

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TABLE 1

SUMMARY OF STEPWISE DISCRIMINANT ANALYSIS

OF DISTRICT A - JUNIOR HIGH STUDENTS USING FSCALES

ASSOCIATED WITH THE YOUTH ASSESSMENT INSTRUMENT AND

ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of FSCALE	Direction of Difference	F Value to Enter or Remove*
1	S3	Achievement and Ability	LD students receive lower test scores	21.92
2	S11	Teacher Support	LD students report more support from teachers	6.35
3	S20	Parents Reaction to Success	LD students report more positive parent reactions to success on tests	4.95

*multivariate F = 11.79; df - 3, 108

TABLE 2

CLASSIFICATION MATRIX FOR DISTRICT A -

JUNIOR HIGH STUDENTS USING FSCALES ASSOCIATED WITH

THE YOUTH ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Number of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	66.7	34	17
LD	70.5	18	43
Total	68.8	52	60

TABLE 3

SUMMARY OF STEPWISE DISCRIMINANT ANALYSIS
OF DISTRICT B - JUNIOR HIGH STUDENTS USING FSCALES
ASSOCIATED WITH THE YOUTH ASSESSMENT INSTRUMENT AND
ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of SCALE	Direction of Difference	F Value to Enter or Remove*
1	S3	Achievement and Ability	LD students receive lower test scores	6.31

*multivariate F = 6.31; df = 1, 107

TABLE 4

CLASSIFICATION MATRIX FOR DISTRICT B -

JUNIOR HIGH STUDENTS USING FSCALES ASSOCIATED WITH

THE YOUTH ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Numbers of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	66.1	39	20
LD	56.0	22	28
Total	61.5	61	48

TABLE 5

SUMMARY OF STEPWISE DISCRIMINANT ANALYSIS

OF DISTRICT A - SENIOR HIGH STUDENTS USING FSCALES

ASSOCIATED WITH THE YOUTH ASSESSMENT INSTRUMENT AND WITH

ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of FSCALE	Direction of Difference	F Value to Enter or Remove*
1	S3	Achievement and Ability	LD students receive lower test scores	48.92
2	S5	Support from Principal, Vice Principal, or Counselor (Would effectively help you)	LA report more support from principals, vice principals, and counselors	5.35
3	S2	Quality of parent interaction and support as seen by youth	LD students report more communication with parents and more satisfaction with that communication	4.38

*multivariate F = 20.77; df = 3, 108

TABLE 6

CLASSIFICATION MATRIX FOR DISTRICT A -

SENIOR HIGH STUDENTS USING FSCALES ASSOCIATED WITH

THE YOUTH ASSESSMENT INSTRUMENT AND WITH ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Number of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	79.6	43	11
LD	82.8	10	48
Total	81.3	53	59

TABLE 7

SUMMARY OF STEPWISE DISCRIMINANT ANALYSIS

OF DISTRICT B - SENIOR HIGH STUDENTS USING FSCALES

ASSOCIATED WITH THE YOUTH ASSESSMENT INSTRUMENT AND WITH

ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of FSCALE	Direction of Difference	F Value to Enter or Remove*
1	S3	Achievement and Ability	LD students receive lower test scores	17.38
2	S22	Work to earn money outside of home	LA students spend more time working out of the home	4.37

*multivariate F = 11.12; df = 2, 120

TABLE 8

CLASSIFICATION MATRIX FOR DISTRICT B - HIGHSCHOOL STUDENTS USING FSCALES ASSOCIATED WITH THE YOUTH ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Number of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	65.5	38	20
LD	69.2	20	45
Total	67.5	58	65

TABLE 9

SUMMARY OF STEPWISE DISCRIMINANT ANALYSIS OF DISTRICT A - JUNIOR HIGH STUDENTS USING FSCALES ASSOCIATED WITH THE PARENT ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of FSCALE	Direction of Difference	F Value to Enter or Remove*
1	S4	Achievement and ability testing	LD students receive lower test scores	13.19
2	S5	Attention, impulsivity, trouble concentrating	LA students rated as less attentive	8.94
3	S7	Time spent and parent help with homework	LD parents spend more time helping with homework	5.56
4	S13	Depressed, moody	LD students rated as more depressed	4.58
5	S16	Parent support of student with a school problem	LD parents more supportive	4.55
6	S25	Frequency of school communications	School communications more frequent with LD parents	4.22

*multivariate F = 8.21; df = 6, 69.

TABLE 10

CLASSIFICATION MATRIX FOR DISTRICT A -

JUNIOR HIGH STUDENTS USING FSCALES ASSOCIATED WITH

THE PARENT ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Number of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	78.8	26	7
LD	83.7	7	36
Total	81.6	33	43

TABLE 11

SUMMARY OF STEPWISE DISCRIMINATE ANALYSIS

OF DISTRICT B - JUNIOR HIGH STUDENTS USING FSCALES

ASSOCIATED WITH THE PARENT ASSESSMENT INSTRUMENT AND

ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of FSCALE	Direction of Difference	F Value to Enter or Remove*
1	S4	Achievement and ability testing	LD students receive lower test scores	5.76
2	S23	Parent satisfaction with schooling	LD parents are more satisfied with schooling	11.14
3	S8	Number of older siblings	Low achievers have more older siblings	6.86
4	S2	Social Activities with peers	Low achievers have more social activities with peers	6.66
5	S22	Parent perception of their own teaching effectiveness	LD parents feel that they teach more effectively	6.95
6	SEX	SEX	More females were in the LA group	5.08
7	S19	Hanging around the neighborhood	Low achievers hang around the neighborhood more often	4.32

*multivariate F = 8.236; df = 7, 76

TABLE 12

CLASSIFICATION MATRIX FOR DISTRICT B -

JUNIOR HIGH STUDENTS USING FSCALES ASSOCIATED WITH

THE PARENT ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Number of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	86.0	37	6
LD	80.5	8	33
Total	83.3	45	39

TABLE 13

SUMMARY OF STEPWISE DISCRIMINATE ANALYSIS

OF DISTRICT A - SENIOR HIGH STUDENTS USING FSCALES

ASSOCIATED WITH THE PARENT ASSESSMENT INSTRUMENT AND

ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of FSCALE	Direction of Difference	F Value to Enter or Remove*
1	S4	Achievement and Ability Testing	LD students receive Lower test scores	40.33
2	S20	Glasses Prescribed	LD student are prescribed glasses more often	6.64
3	S9	Number of Younger Siblings	LD student has more younger siblings	6.72
4	S11	Staying Home: entertaining self at home	LD student more often entertains self at home	7.57

*multivariate F = 18.08; df = 4, 80

TABLE 14

CLASSIFICATION MATRIX FOR DISTRICT A -

SENIOR HIGH STUDENTS USING FSCALES ASSOCIATED WITH

THE PARENT ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Number of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	79.5	31	8
LD	87.0	6	40
Total	83.5	37	48

TABLE 15

SUMMARY OF STEPWISE DISCRIMINATE ANALYSIS

OF DISTRICT B - SENIOR HIGH STUDENTS USING FSCALES

ASSOCIATED WITH THE PARENT ASSESSMENT INSTRUMENT AND

ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of FSCALE	Direction of Difference	F Value to Enter or Remove*
1	S4	Achievement and Ability Testing	LD students receive lower test scores	9.52
2	S18	Smoking and drinking during pregnancy	More LD mothers smoked and drank during pregnancy	7.84
3	S20	Glasses prescribed	LD student are prescribed glasses more often	6.30
4	S16	parent support of student with a school problem	LD parents are more supportive when school problems occur	4.44
5	S13	depressed, moody	Low achievers are more depressed	5.20
6	S24	Youth's eating habits	LD students have had more eating habit problems over time	4.35
7	S5	attention, impulsivity, trouble concentrating	LD students have more problems with attention impulsivity etc...	4.26

*multivariate F = 7.68; df = 7, 54

TABLE 16

CLASSIFICATION MATRIX FOR DISTRICT B -

SENIOR HIGH STUDENTS USING FSCALES ASSOCIATED WITH

THE PARENT ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Number of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	86.2	25	4
LD	87.9	4	29
Total	87.1	29	33

TABLE 17

SUMMARY OF STEPWISE DISCRIMINANT ANALYSIS

OF DISTRICT A - JUNIOR HIGH STUDENTS USING FSCALES

ASSOCIATED WITH THE TEACHER ASSESSMENT INSTRUMENT AND

ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of FSCALE	Direction of Difference	F Value to Enter or Remove*
1	S6	Achievement and ability testing	LD students get lower scores	37.94
2	S1	Turns in work neat, accurate and on time.	LD rated as having better work habits	16.28
3	S9	Depression	Low Achievers rated as more depressed	4.15
4	S10	Social status with peers, social confidence	LD rated as more accepted and socially assured	4.44
5	S5	Courteous to teacher	LD rated as being more courteous	7.20

*multivariate F = 17.30; df = 5, 86

TABLE 18

CLASSIFICATION MATRIX FOR DISTRICT A -

JUNIOR HIGH STUDENTS USING FSCALES ASSOCIATED WITH

THE TEACHER ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Number of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	91.1	41	4
LD	83.0	8	39
Total	87.0	49	43

TABLE 19

SUMMARY OF STEPWISE DISCRIMINANT ANALYSIS

OF DISTRICT B - JUNIOR HIGH STUDENTS USING FSCALES

ASSOCIATED WITH THE TEACHER ASSESSMENT INSTRUMENT AND

ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of FSCALE	Direction of Difference	F Value to Enter or Remove*
1	S6	Achievement and ability testing	LD students get lower scores	4.00
2	S5	Courteous to teacher	LD rated as being more courteous	8.40

*multivariate F = 6.35; df = 2, 95

TABLE 20

CLASSIFICATION MATRIX FOR DISTRICT B -

JUNIOR HIGH STUDENTS USING FSCALES ASSOCIATED WITH

THE TEACHER ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Number of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	62.7	32	19
LD	70.2	14	33
Total	66.3	46	52

TABLE 21

SUMMARY OF STEPWISE DISCRIMINANT ANALYSIS

OF DISTRICT A - HIGH SCHOOL STUDENTS USING FSCALES ASSOCIATED

WITH THE TEACHER ASSESSMENT INSTRUMENT AND

ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of FSCALE	Direction of Difference	F Value to Enter or Remove*
1	S6	Achievement and ability testing	LD students get lower scores	39.06
2	S8	Misinterprets what others say/trouble learning from experiences	LA students rated as having trouble more often	4.72
3	S10	Social skills with peers, social confidence	LA students rated as more accepted and socially assured	13.49
4	S3	Organization, comprehension, recognizing errors, word attack	LD students rated as more poorly on these skills	5.30
5	S4	Emotional lability - explodes, etc.	LD students rated as more emotionally labile	4.02

*multivariate F = 15.74; df = 5, 97

TABLE 22

CLASSIFICATION MATRIX FOR DISTRICT A -

HIGHSCHOOL STUDENTS USING FSCALES ASSOCIATED WITH

THE TEACHER ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Number of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	90.0	45	5
LD	77.4	12	41
Total	83.5	57	46

TABLE 23

SUMMARY OF STEPWISE DISCRIMINANT ANALYSIS

OF DISTRICT B - HIGH SCHOOL STUDENTS USING FSCALES ASSOCIATED

WITH THE TEACHER ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Step Number	Variable Entered	Description of FSCALE	Direction of Difference	F Value to Enter or Remove*
1	S6	Achievement and ability testing	LD students get lower scores	13.36
2	S7	Word recognition	LD rated as having more difficulty	6.78
3	S8	Misinterprets what others say/trouble learning from experiences	LA students rated as having trouble more often.	4.63
4	S12	Coordination/makes decision easily	LA students rated as making decisions more easily	5.58

*multivariate F = 8.25; df = 4, 102

TABLE 24

CLASSIFICATION MATRIX FOR DISTRICT B -

HIGHSCHOOL STUDENTS USING FSCALES ASSOCIATED WITH

THE TEACHER ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

Groups	Percent Correct	Number of Cases Classified Into Groups	
		Low-Achieving	LD
Low-Achieving	71.2	37	15
LD	74.5	14	41
Total	72.9	51	56

Table 25

PERCENT TOTAL CORRECT CLASSIFICATION

FOR THREE SETS OF VARIABLES ASSOCIATED WITH THE

YOUTH ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

	Junior High		Senior High	
	District A n=112	District B n=109	District A n=112	District B n=123
Variable Set				
All FSCALES	69%	62%	81%	68%
Cognitive/Academic FSCALE ONLY	72%	62%	77%	66%
Written Language Cluster Only	74%	66%	76%	73%

Table 26

PERCENT TOTAL CORRECT CLASSIFICATION FOR THREE SETS OF VARIABLES ASSOCIATED WITH THE PARENTS ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

	Junior High		Senior High	
	District A	District B	District A	District B
Variable Set	n=76	n=84	n=85	n=62
All FSCALES	82%	83%	84%	87%
Selected FSCALES	75%	77%	84%	76%
Cognitive/Academic FSCALE ONLY	70%	64%	77%	63%

Table 27

PERCENT TOTAL CORRECT CLASSIFICATION

FOR TWO SETS OF VARIABLES ASSOCIATED WITH THE

TEACHER ASSESSMENT INSTRUMENT AND ABILITY/ACHIEVEMENT TESTS

	Junior High		Senior High	
	District A	District B	District A	District B
Variable Set	n=92	n=98	n=103	n=107
All FSCALES	87%	66%	84%	73%
Cognitive/Academic FSCALE ONLY	79%	59%	74%	66%

TABLE 28

FSCALES WHICH WERE INCLUDED

IN MORE THAN ONE SAMPLE AND

IN WHICH THE DIRECTION OF GROUP

DIFFERENCE WAS THE SAME

Description of FSCALE or Test and Direction of Difference	Instrument or Tests	Number of Samples in which the FSCALE was Included
Ability and Achievement Tests (LD students perform more poorly)	Woodcock-Johnson Wechsler Scales	4
Parent Support (LD parents more supportive)	Parent	2 (A Junior, B-Senior)
Glasses Prescribed (glasses were prescribed for LD students more often).	Parent	2 (Senior High Only)
Courteous to Teacher (LD students rated as more courteous)	Regular Teacher	2 (Junior High Only)
Misinterprets what Others Say/Trouble Learning from Experience (LA students rated as having more trouble)	Regular Teacher	2 (High School Only)